

REMARKS

Claims 1-17 are now pending in the application. Claims 16 and 17 are added. Claims 1-4, 6-7, and 9-15 stand rejected under 35 U.S.C. § 102(e). Claims 5 and 8 are rejected under 35 U.S.C. 103(a). The following remarks are considered by Applicants to overcome each rejection raised by the Examiner and to place the application in condition for allowance. An early Notice of Allowance is therefore requested.

I. Interview Summary

Applicants thank the Examiner for the interview conducted on January 19, 2006. In the interview, it was provided that the cited reference fails to teach or suggest all the features of the claimed invention. In particular, Applicants submitted that Murai fails to teach or suggest a plurality of electrode layers which are stacked alternately with the piezoelectric layers. The Examiner agreed with our position that Murai fails to teach or suggest this feature. In view of this amendment and the interview, Applicants request the withdrawal of the rejection of claims 1-15 under 35 U.S.C. 102 and 103.

II. Priority

The Examiner has acknowledged the claim for foreign priority based on the patent application filed in Japan on February 25, 2003. A certified copy of the Japanese Patent Application (JP 2003 – 047546) is submitted herewith.

III. Information Disclosure Statement

Applicants submit an Information Disclosure Statement for consideration.

IV. Rejection of Pending Claims 1-4, 6-7, and 9 - 15 Under 35 U.S.C. § 102(e)

Claims 1-4, 6, 7, and 9-15 stand rejected as being anticipated by Murai (U.S. Publication 2003/76007). This rejection is traversed and believed overcome in view of the following discussion.

A. Relevant Law

"A claim is anticipated if each and every limitation is found either expressly or inherently in a single prior art reference." *Bristol-Myers Squibb v. Ben Venue*, 246 F.3d 1368, 1374 (Fed. Cir. 2001). Identity of invention requires that a prior reference disclose to one of ordinary skill in the art all elements and limitations of the patent claim. *Scripps Clinic*

v. *Genentech*, 927 F.2d 1565, 1576 (Fed. Cir. 1991). Absence from the reference of any claimed element negates anticipation. *Kloster Speedsteel AB v. Crucible, Inc.*, 230 USPQ 81 (Fed. Cir. 1986).

B. Summary of Cited References

Murai discloses a piezoelectric thin film element with superior piezoelectric properties in which the condition of the crystal of the piezoelectric thin film is controlled. The piezoelectric thin film element includes a top electrode, a bottom electrode, and a piezoelectric thin film formed between the top electrode and the bottom electrode, wherein the piezoelectric thin film is structured so as to comprises a first layer located nearest to the bottom electrode and second layers that are located nearer to the top electrode than the first layer and that have a thickness greater than that of the first layer.

C. Argument

The Examiner asserts that Murai teaches all the features recited in claims 1-4, 6, 7, and 9-15. Applicant respectfully disagrees with the Examiner's analysis.

Independent claims 1 and 12 each define "a plurality of electrode layers which are stacked alternatively with the piezoelectric layers". The Examiner states that Murai discloses a plurality of electrode layers stacked alternatively with the piezoelectric layers, as recited by each of these claims. Applicants respectfully disagree.

Although Murai discloses electrodes 42 and 44 sandwiching the piezoelectric layers 431-436, Murai does not teach or suggest a plurality of electrodes sandwiching each the piezoelectric layers 431-436. Murai discloses a piezoelectric thin film 43 being structured by stacking six layers. The first layer 431 is located nearest to the bottom electrode and the layers 432, 433, 434, 435, and 436 are formed sequentially thereon toward the top electrode (See Paragraph 0063). However, Murai does not teach or suggest a plurality of electrodes being formed in between each of the layers 432-436. Rather, a single top electrode and a bottom electrode which encompass all the six layers are disclosed.

In contrast, as is recited by independent claims 1 and 12, an electrode is positioned between each one of the plurality of piezoelectric layers. Specifically, illustrated in Figure 7 of the present invention, electrodes 24 and 25 are positioned alternatively between each of the piezoelectric layers. Murai, however, only discloses electrodes 42 and 44 and does not teach or suggest a plurality of electrodes positioned between each or the piezoelectric layers. Therefore, Applicants respectfully submit that Murai fails to teach or suggest a plurality of

piezoelectric layers and a plurality of electrode layers which are stacked alternately with the piezoelectric layers.

Independent claims 1 and 12 also require that respective portions of the piezoelectric layers being sandwiched by corresponding two electrode layers and the corresponding two electrode layers being opposed to each other in a direction of the alternate stacking of the piezoelectric layers. Murai does not teach or suggest this feature as well. Murai discloses that by reducing the thickness of the first precursor layer...and reducing the thickness during annealing process makes it possible to appropriately anneal the first layer and to obtain a fine crystal film with a high (100) plane degree of orientation, and that making the thickness of the second layer...greater than the thickness of the first layer improves productivity. Murai also discloses that since each layer formed about the first layer is formed while being sequentially crystallized in accordance with the condition of the crystal of the first layer having a fine crystal structure, the layers form a thin film comprising fine crystals even though thickness during annealing is increased. Thus, the first layer 431 having a small thickness and the second layers 432-436 each having a large thickness cooperating with each other to function as a single integral piezoelectric thin film 43 having an entire thickness between 0.5 μ m and 1.5 μ m. This entire thickness of the thin film 43 is much smaller than a thickness (between 10 μ m and 150 μ m) of each piezoelectric layer. Thus, it is respectfully submitted that Murai fails to teach or suggest providing an electrode layer between the thin first layer 431 and the thick second layers 432-436.

In view of the above distinctions, Applicants submit that Murai fails to teach or suggest all the features recited in claim 1. Applicants request the withdrawal of the rejection of claim 1 under 35 U.S.C. 102(e).

Claims 2-4, 6, 7, 9-11 and 13-15 are dependent upon independent claims 1 and 12. Therefore, it is submitted that for at least the reasons mentioned above, these claims recite patentable subject matter. Accordingly, Applicants request the withdrawal of the rejection of claims 2-4, 6, 7, 9-11 and 13-15 under 35 U.S.C. 102(e).

V. Rejection of pending claims 5 and 8 Under 35 U.S.C. 103(a) as being unpatentable over Murai.

Claims 5 and 8 are rejected as being unpatentable over Murai. This rejection is traversed and believed overcome in view of the following discussion. That is, Murai fails to teach or suggest a plurality of piezoelectric layers and a plurality of electrode layers which are stacked alternately with the piezoelectric layers. Claims 5 and 8 are dependent upon

claim 1. Therefore, it is submitted that claims 5 and 8 recite patentable subject matter for at least the reasons mentioned above. Therefore, Applicants request the withdrawal of the rejection of claims 5 and 8 under 35 U.S.C. 103(a).

VI. New Claims

Claims 16 and 17 are added. No new matter is presented. Claims 16 and 17 recite that the plurality of electrode layers comprise at least three electrode layers including a first pair of electrode layers which cooperate with each other to sandwich said at least one first piezoelectric layer and a second pair of electrode layers which cooperate with each other to sandwich said at least one second piezoelectric layer. It should be noted that in the case where the plurality of electrode layers consist of three electrode layers, the first and second pairs of electrode layers share a common electrode layer and in the case where the plurality of electrode layers consist of four or more electrode layers, the first and second pairs of electrode layers may or may not, share a common electrode layer. In the latter case, if the first and second pairs of electrode layers do not share a common electrode layer, at least one third piezoelectric layer having a third thickness may be sandwiched by one electrode layer of the first pair of electrode layers and one electrode layer of the second pair of electrode layers. Claims 16 and 17 are dependent upon claim. Therefore, Applicants submit by that by the above distinctions, claims 16 and 17 recite patentable subject matter.

VII. Conclusion

In view of the above remarks, Applicants submit claims 1-17 recite subject matter that is neither taught nor suggested by the applied references. Thus, for the reasons presented above, claims 1-17 are believed by Applicant to define patentable subject matter and should be passed to issue at the earliest possible time. A Notice of Allowance is requested.

Respectfully submitted

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